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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/571,871	03/15/2006	Paul Boyle	20511-002001 WPP290222	6891

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EXAMINER	
SAHU, MEENAKSHI S	
ART UNIT	**PAPER NUMBER**
2881	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/571,871	BOYLE ET AL.	
	Examiner	Art Unit	
	MEENAKSHI S. SAHU	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/11/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 to 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Döring et al. (US 6,107,624) in view of Miller et al. (" A novel micromachined high-field asymmetric waveform-ion mobility spectrometer", Sensors and Actuators B, vol 67, (2000) pages 300 to 306).

Regarding claims 1, 10 to 17, 29, 30, 35 and 36 to 38, Döring et al. disclose an ion mobility spectrometer or IMS [abstract] and method of analyzing a sample, comprising an ionizer [*ion source*, element 2 Fig 1, claim 1], an ion filter where the ion filter defines at least one ion channel along which ions may pass from the ionizer to the ion detector [*drift tube*, claim 1]; and the spectrometer further comprising control means for applying electric potential to the conductive layers of the ion channel [column 1 lines 9 to 10, claim 1] and an ion detector [column 2, lines 50 to 52, claim 1].

Döring et al. fail to explicitly disclose that the ion channel is defined by a plurality of conductive layers separated along the length of the channel by at least one non-conductive layer.

However Miller et al. teach an ion channel is defined by a plurality of conductive layers

separated along the length of the channel by at least one non-conductive layer [Section 3.1, page 302], the filter comprises a resistive or semiconductive substrate on which the conductive layers and non-conductive layer are provided [Section 3.1, Fig 3], the substrate is the ion detector [Section 3.1 page 302] , and that the ion filter comprises a wafer-like form and comprises a plurality of stacked planar layers [Section 3.1].

Given the teachings of Miller et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Döring et al. and make an IMS that is miniaturized but with the same level of analytic performance. This can be done through a process called micromachining, a technology which is similar to that used in the semiconductor industry. Using wafers and processes like patterning the resist using photolithography, the resulting miniaturized IMSs are low in cost and high precision devices.

Regarding claim 2, Döring et al.'s invention discloses a deflector for deflecting ions away from the ionizer and towards the ion detector [column 4 lines 21 to 24].

Regarding claim 3 to 6, Döring et al.'s invention discloses all the claimed limitations except the control means that allows the application of a time-varying electric potential to the conductive layers, oscillating electric potential, and a time-varying electric potential in an asymmetric manner.

However Miller et al. teach a control means that allows the application of a time-varying electric potential to the conductive layers [page 301, Section 2].

Given the teachings of Miller et al. it would have been obvious to one of ordinary skill in

the art at the time the invention was made to modify the invention of Döring et al. and make an IMS that is miniaturized but with the same level of analytic performance resulting in low cost and high precision devices.

Regarding claims 7 to 9, Döring et al.'s invention discloses all the claimed limitations except the filter comprises a plurality of ion channels, the conductive layers form electrodes and the ion channels are defined at either end by apertures in said electrodes.

However Miller et al. teach a filter comprising a plurality of ion channels and with conductive layers forming electrodes and ion channels defined at either end by apertures [Section 3.1, page 302].

Given the teachings of Miller et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Döring et al. and make an IMS that is miniaturized but with the same level of analytic performance resulting in low cost and high precision devices.

Regarding claims 18 to 28, 31 to 34, Döring et al.'s invention discloses all the claimed limitations except the filter comprises a plurality of ion channels, the conductive layers form electrodes and the ion channels are defined at either end by apertures in said electrodes.

However Miller et al. teach a filter comprising a plurality of ion channels and with conductive layers forming electrodes and ion channels defined at either end by apertures [Section 3.1, page 302], a means for generating a gas flow through the

spectrometer and that the gas flow is a counterflow against the direction of motion of the ions [Section 2, page 301].

Given the teachings of Miller et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Döring et al. and make an IMS that is miniaturized but with the same level of analytic performance resulting in low cost and high precision devices.

Miller et al. do not explicitly teach a semi-permeable membrane, a heating element, the inlet tube, a standard, multiple ion detectors or means for heating the filter by Joule effect heating. However it would have been obvious to one of ordinary skill in the art at the time of the invention was made to include (1) a membrane to prevent dust from entering the spectrometer (2) a heating element to vary the temperature of the membrane to influence diffusion processes across the membrane and act as a pre concentrator (3) use a standard to calibrate the spectrometer, (4) use multiple ion detectors to improve efficiency and (5) use Joule effect heating since relatively low voltages are needed to provide effective heating using this method.

Regarding claim 39, Döring et al.'s invention discloses all the claimed limitations except the method of providing a planar substrate, patterning the substrate to provide a filter and attaching the filter onto the substrate.

However Miller et al. teach miniaturizing an IMS through a process called micromachining, with wafers and processes like patterning the resist using photolithography.

Given the teachings of Miller et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Döring et al. and make an IMS that is miniaturized since the resulting IMSs are low in cost and high in precision.

Regarding claims 40 and 41, Döring et al.'s invention discloses all the claimed limitations except the ion filters with ion channels where the filter comprises several electrodes and the spectrometer further comprising electrode control means for controlling the electrodes such that a first drive electric field is generated along the length of the ion channel, and a second transverse electric field is generated orthogonal to the first; and additional control means for operating the spectrometer periodically to sample at intervals.

However Miller et al. teach a such an ion filter and a spectrometer [Section 2 page 301, Section 3.1, page 302 and Figs 2 and 3].

Given the teachings of Miller et al. it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Döring et al. and make an IMS that is miniaturized but with the same level of analytic performance, resulting in low cost and high precision devices.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MEENAKSHI S. SAHU whose telephone number is

(571)270-3101. The examiner can normally be reached on Monday - Friday 8AM - 5PM est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meenakshi S Sahu/
Examiner, Art Unit 2881

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881